be made by one skilled in the art without departing from the spirit and teachings of the invention. The embodiments described herein are exemplary only, and are not limiting. Many variations and modifications of the methods and compositions of the invention disclosed herein are possible and are within the scope of the invention. Accordingly, the scope of protection is not limited by the description set out above, but is only limited by the claims which follow, that scope including all equivalents of the subject matter of the claims.

Claims

What is claimed is:

1. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte.
2. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted at a temperature in the range of about 38° C to 48° C.
3. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted at a temperature in the range of about 40° C to 46° C.
4. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted at a temperature in the range of about 42° C to 44° C.
5. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted over a time period range of about 5 to 60 minutes.
6. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted over a time period range of about 5 to 30 minutes.
7. The method of treating atrial fibrillation of claim 1 wherein said heating is conducted over a time period range of about 5 to 15 minutes.
8. The method of treating atrial fibrillation of claim 1, said method further comprising detecting the presence of an arrhythmogenic focus comprising an atrial myocyte.
9. The method of treating atrial fibrillation of claim 8, wherein said detecting step comprises electrically detecting the presence of said atrial myocyte.
10. The method of treating atrial fibrillation of claim 8, wherein said detecting step comprises detecting the presence of said atrial myocyte using positron emission tomography.

11. The method of treating atrial fibrillation of claim 10, wherein said positron emission tomography tracks differential uptake of a radio-contrast agent by said atrial myocyte.

12. The method of treating atrial fibrillation of claim 11, wherein said radio-contrast agent is 18-fluorodeoxyglucose.

13. The method of treating atrial fibrillation of claim 8, wherein said detecting step comprises thermogenically detecting the presence of said atrial myocyte.

14. The method of treating atrial fibrillation of claim 1, said method further comprising monitoring apoptosis of said atrial myocyte.

15. The method of treating atrial fibrillation of claim 14, wherein said monitoring step comprises electrically monitoring for the presence of said atrial myocyte.

16. The method of treating atrial fibrillation of claim 14, wherein said monitoring step comprises detecting the presence of said atrial myocyte using positron emission tomography.

17. The method of treating atrial fibrillation of claim 16, wherein said positron emission tomography tracks differential uptake of a radio-contrast agent by said atrial myocyte.

18. The method of treating atrial fibrillation of claim 17, wherein said radio-contrast agent is 18-fluorodeoxyglucose.

19. The method of treating atrial fibrillation of claim 14, wherein said monitoring step comprises thermogenically detecting the presence of said atrial myocyte.

20. The method of treating atrial fibrillation of claim 14, wherein said thermogenic detection of the presence of said atrial myocyte further comprises using an infrared ballon catheter.

21. The method of treating atrial fibrillation of claim 1, additionally comprising applying at least one additional trigger of apoptosis to said atrial myocyte.

22. The method of treating atrial fibrillation of claim 21, wherein said additional trigger of apoptosis is selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial myocyte; causing hypoglycemia in said atrial myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte.

23. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte by heating, wherein said heating is conducted at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes.

24. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte by heating, further comprising detecting said atrial myocyte, and heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes

25. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte by heating, wherein said heating is conducted at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocyte.

26. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte by heating, further comprising detecting said atrial myocyte, heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocyte.

27. A method of treating atrial fibrillation comprising inducing apoptosis of an atrial myocyte by heating, further comprising detecting said atrial myocyte, heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocyte, and wherein at least one additional trigger of apoptosis is applied to said atrial myocyte, said trigger selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial myocyte; causing hypoglycemia in said atrial myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte.

28. An improved method of treating atrial fibrillation comprising: inducing apoptosis of an atrial myocyte by heating, further comprising detecting said atrial myocyte, heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocyte, and wherein at least one additional trigger of apoptosis is applied to said atrial myocyte, said trigger selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial

myocyte; causing hypoglycemia in said atrial myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte.

29. A method of eliminating an arrhythmogenic focus in a pulmonary vein comprising inducing apoptosis of an atrial myocyte by heating.

30. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted at a temperature in the range of about 38° C to 48° C.

31. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted at a temperature in the range of about 40° C to 46° C.

32. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted at a temperature in the range of about 42° C to 44° C.

33. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted over a time period range of about 5 to 60 minutes.

34. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted over a time period range of about 5 to 30 minutes.

35. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29 wherein said heating is conducted over a time period range of about 5 to 15 minutes.

36. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29, said method further comprising detecting the presence of an arrhythmogenic focus comprising atrial myocytes.

37. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 36, wherein said detecting step comprises electrically detecting the presence of said atrial myocytes.

38. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 36, wherein said detecting step comprises detecting the presence of said atrial myocytes using positron emission tomography.

39. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 38, wherein said positron emission tomography tracks differential uptake of a radio-contrast agent by said atrial myocytes.

40. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 39, wherein said radio-contrast agent is 18-fluorodeoxyglucose.

41. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 36, wherein said detecting step comprises thermogenically detecting the presence of said atrial myocytes.

42. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29, said method further comprising monitoring apoptosis of said atrial myocytes.

43. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 42, wherein said monitoring step comprises electrically detecting the presence of said atrial myocytes.

44. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 42, wherein said monitoring step comprises detecting the presence of said atrial myocytes using positron emission tomography.

45. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 44, wherein said positron emission tomography tracks differential uptake of a radio-contrast agent by said atrial myocytes.

46. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 45, wherein said radio-contrast agent is 18-fluorodeoxyglucose.

47. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 42, wherein said monitoring step comprises thermogenically detecting the presence of said atrial myocytes.

48. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 47, wherein said thermogenic detection of the presence of said atrial myocytes further comprises using an infrared ballon catheter.

49. The method of eliminating an arrythmogenic focus in a pulmonary vein of claim 29, wherein said additional trigger of apoptosis is selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial myocyte; causing hypoglycemia in said atrial myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte.

50. A method of eliminating an arrythmogenic focus in a pulmonary vein comprising inducing apoptosis of a group of atrial myocytes by heating, wherein said heating is conducted at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes.

51. A method of eliminating an arrythmogenic focus in a pulmonary vein comprising inducing apoptosis of a

group of atrial myocytes, further comprising detecting said atrial myocytes, and heating said atrial myocytes at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes

52. A method of eliminating an arrythmogenic focus in a pulmonary vein comprising inducing apoptosis of a group of atrial myocytes by heating, wherein said heating is conducted at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocytes.

53. A method of eliminating an arrythmogenic focus in a pulmonary vein comprising inducing apoptosis of a group of atrial myocytes, further comprising detecting said atrial myocytes, heating said atrial myocytes at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, and monitoring apoptosis of said atrial myocytes.

54. A method of eliminating an arrhythmogenic foci in a pulmonary vein comprising inducing apoptosis of a group of atrial myocytes by heating.

55. A method of eliminating an arrhythmogenic foci in a pulmonary vein comprising, detecting an atrial myocyte, heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes in order to induce apoptosis in said atrial myocyte, applying at least one additional trigger of apoptosis to said atrial myocyte, said trigger selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial myocyte; causing hypoglycemia in said atrial myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte, and monitoring apoptosis of said atrial myocyte.

56. An improved method of eliminating an arrhythmogenic foci in a pulmonary vein, comprising: detecting an atrial myocyte, heating said atrial myocyte at a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes in order to induce apoptosis in said atrial myocyte, applying at least one additional trigger of apoptosis to said atrial myocyte, said trigger selected from the group: application of tumor necrosis factor alpha to said atrial myocyte; pressure against said atrial myocyte; stretching said atrial myocyte; causing hypoxia in said atrial myocyte; causing hypoglycemia in said atrial

myocyte; causing acidosis in said atrial myocyte; and application of oxidants to said atrial myocyte, and monitoring apoptosis of said atrial myocyte.

57. A device for eliminating an arrhythmogenic focus in a pulmonary vein comprising:

a heating element capable of maintaining a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes; and,

at least one detector capable of detecting the presence or absence of an arrhythmogenic focus comprising atrial myocytes.

58. The device of claim 57, wherein said detector electrically detects the presence of said atrial myocytes by their ectopic electronic emissions.

59. The device of claim 57, wherein said detector detects the presence of said atrial myocytes using positron emission tomography.

60. The device of claim 59, wherein said detector tracks differential uptake of a radio-contrast agent by said atrial myocytes using positron emission tomography.

61. The device of claim 57, wherein said detector is capable of thermogenically detecting the presence of said atrial myocytes.

62. The device of claim 57, wherein said detector is capable of monitoring apoptosis of said atrial myocytes.

63. The device of claim 57, wherein said detector is capable of both detecting the presence of atrial myocytes and of monitoring the removal of said atrial myocytes.